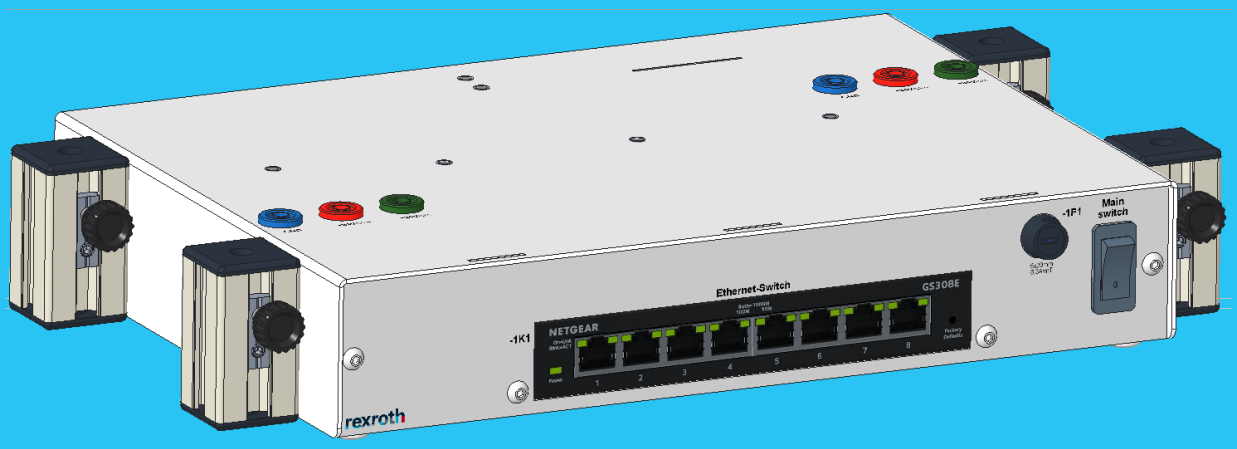
rexroth
A Bosch Company

Operating instructions

Automax 100

Basic module TS-AC B1-M2-1X



DOK-SUPPL*-TS-AC B1-M2-ITRS-EN-P | 04.2021 | Bosch Rexroth AG

Impressum

The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.

The original operating instructions were created in the German language.

Model series Automax 100

Title Basic module TS-AC B1-M2-1X

Type of documentation Operating instructions

Documentation type DOK-SUPPL*-TS-AC B1-M2-ITRS-EN-P

Materialnummer R901540429

Purpose of the documentation Primäre Information zur Nutzung
Sicherheitshinweise
Inbetriebnahme
Bedienung
Handhabung
Technischer Aufbau

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Contents

1 About this documentation

1.1 Validity of the documentation

This documentation applies to the following products:

- Material number of product: R901540131
- Basic module TS-AC B1-M2-1X

This documentation is intended for trainers, training participants, operators and the system end-user.
This documentation contains important information on how to assemble, transport, commission, operate, use, maintain and disassemble the basic module TS-AC B1-M2-1X safely and properly and to resolve simple faults independently.

▶ You should read this documentation thoroughly, and in particular the chapter „Safety instructions" before working with the product.

1.2 Supplementary documentation

The following table provides links to the manufacturer site of NETGEAR Ethernet switches. On these sites, you will find additional information on the integrated Ethernet switch.
These operating instructions and the titles with document numbers in the following table can be found online in the Bosch Rexroth media directory: https://brmv2.kittelberger.net.

Table 1: Supplementary documentation

	Title	Dokument number	Dokument type
	NETGEAR GS308E https://www.downloads.netgear.com/files/GDC/GS305E/GS305E_GS308E_IG_GR.pdf	---	Data sheet
	NETGEAR GS308E https://www.downloads.netgear.com/files/GDC/GS305E/GS305E_GS308E_IG_GR.pdf	---	Installation instructions
	NETGEAR GS308E https://www.downloads.netgear.com/files/GDC/GS105EV2/WebManagedSwitches_UM_EN.pdf	---	User manual
	Security guidelines Electric drives and controls	R911342561	Project description

1.3 Illustration of information

Uniform safety instructions, symbols, terms and abbreviations are used so that you can quickly and safely work with your product using this documentation. For better understanding, they are explained in the following sections.

1.3.1 Safety instructions

In this documentation, safety instructions are included whenever sequences of actions are explained which bear the danger of personal injury or damage to property. The measures described for the hazard avoidance must be observed.
Safety instructions are set out as follows:

SIGNAL WORD

Type and source of danger
Consequences of non-compliance
- Hazard avoidance measures
- <List>

- **Warning sign:** Draws attention to the danger
- **Signal word:** Indicates the seriousness of the danger
- **Type and source of danger:** Designates the type and source of danger
- **Consequences:** Describes the consequences of non-compliance
- **Precautions:** Specifies how the danger can be prevented

Table 2: Risk classes according to ANSI Z535.6-2006

Warning sign, signal word	Meaning
DANGER	Indicates a dangerous situation which may cause death or severe personal injuries if not avoided
WARNING	Indicates a dangerous situation which may cause death or severe personal injuries if not avoided
CAUTION	Indicates a dangerous situation which may cause minor to medium personal injuries if not avoided
NOTICE	Indicates damage to property: The product or the environment could be damaged

1.3.2 Symbols

The following symbols indicate notes which are not safety-relevant but increase the comprehensibility of the documentation.

Table 3: Meaning of symbols

Symbol	Meaning
	If this information is not observed, the product cannot be optimally used and/or operated.
	Tip, general note, useful additional information
	Observe instructions on disposal and environmental protection
•	Enumeration

▶	Individual, independent action
1. 2. 3.	Numbered instruction: The numbers indicate that the actions must be carried out one after the other.
[▶**]	Indicates the page of a cross reference
Text	Indicates a cross reference in this document
http://	Indicates a hyperlink in this document

1.3.3 Designations

The following designations are used in this documentation:

Table 4: Designations

Designation	Meaning
TS	Training system
Basic module	Basic module TS-AC B1-M2-1X
Extension modules	Various extension modules are available

1.3.4 Abbreviations

The following abbreviations are used in this documentation:

Table 5: Abbreviations

Abbreviation	Meaning
BR	Bosch Rexroth
RD	Rexroth document
DC	Direct current
AC	Alternating current

Table 6: General abbreviations

Abbreviation	Unit	Meaning
U	V	Electrical voltage
I	A	Electric current intensity
U_{LS}	V	Supply voltage for logic and sensor (DC voltage)
U_A	V	Supply voltage for actuators (DC voltage)
R	Ω	Electrical resistance
P	W	Electric power
F	Hz	Frequency
H	%	Air humidity
T	℃	Temperature
L_P	dB	Sound pressure level (according to ISO 11205)
NN	m	Height above sea level
B	mm	Width
H	mm	Height

Abbreviation	Unit	Meaning
T	mm	Depth
M	kg	Weight

2 Safety instructions

2.1 About this chapter

The product has been manufactured according to the generally accepted rules of technology. However, there is still the danger of personal injury and damage to property if you do not observe this chapter and the safety instructions in this documentation.

- Read this documentation completely and thoroughly before working with the product. If you have not clearly understood the documentation in the available language, please contact your responsible Rexroth sales representative
- Keep this documentation in a location where it is accessible to all users at all times
- Always include the required documentation when you pass the product on to third parties
- The unobjectionable and safe operation of this device requires appropriate and proper transport, storage, assembly and installation as well as careful operation and maintenance

2.2 Intended use

Bosch Rexroth products are developed and produced according to the relevant state-of-the-art. Before their delivery, they are checked for their operationally safe condition.
Before using the Bosch Rexroth products, the following prerequisites must be complied with in order to guarantee intended use of the products:

- Everyone who in any way deals with our products must read and understand the corresponding safety regulations and notes regarding the intended use
- Software products must not be decompiled; their source codes must not be modified
- Damaged or defective products must not be installed or commissioned

The product may be used as follows:

- To impart knowledge and skills in the field of drive and control engineering as well as control technology
- For educational and commercial applications
- As training system

The product is not intended for private use.
Intended use also includes having read and understood this documentation completely, especially the chapter „Safety instructions“ as of page [▶7] and the chapter „General instructions concerning property damage and product damage“ as of page [▶15].

2.3 Improper use

Any use deviating from the intended use is improper and thus not admissible.

Bosch Rexroth AG does not assume any liability for damage caused by improper use. The user assumes all risks involved with improper use.

Improper use of the product is defined as in particular:

- Exposure to operating conditions which do not satisfy the prescribed environmental conditions. Examples of prohibited operation include operation under water, under extreme temperature variations or extreme maximum temperatures

2.4 Qualification of personnel

2.4.1 General informations

Basic mechanical and electric knowledge as well as knowledge of corresponding technical terms is required for assembly, commissioning, maintenance (incl. service, inspection, repair) and disassembly. To ensure operational reliability, these activities may therefore only be performed by a qualified expert or an instructed person under the supervision of an expert. Experts are those who are able to recognize potential dangers and apply the appropriate safety measures due to their professional training, knowledge and experience, as well as their understanding of the relevant conditions pertaining to the work to be undertaken. An expert must observe the relevant specific professional rules.

2.4.2 Teaching

At this product, trainees may only work:

- under direct supervision
- after being given appropriate instructions

by an instructor or trained member of staff.

2.4.3 Trained personnel

For the supervision during the exercises, trained personnel may also be used.
These are qualified people who were instructed and briefed in relation to:

- Tasks ordered
- Possible dangers in the event of improper use
- Safeguards and protective measures

2.5 General safety instructions

- Observe the valid regulations on accident prevention and environmental protection
- Observe the safety regulations and provisions of the country where the product is implemented/used
- Exclusively use Rexroth products in technically perfect condition.
- Observe all notes on the product
- Persons permitted to assemble, operate, disassemble or maintain Rexroth products must not be under the influence of alcohol, other drugs or medication which can impair responsiveness when doing so
- Only use spare parts approved by the manufacturer in order to exclude hazards to persons due to unsuitable spare parts
- Comply with the technical data and environmental conditions specified in the product documentation

2.6 Product and technology-dependent safety instructions

2.6.1 Introduction

The following notes must be read before the first commissioning of the system to avoid physical injury and/or damage to property. These safety instructions must be observed at all times.
Do not attempt to install or commission this device without first reading all documentation provided with the system. Please contact your responsible Bosch Rexroth customer service in case you are not provided with any user information.
If the device is resold, rented and/or passed on to others in any other form, these operating instructions must be handed over, as well.

2.6.2 Hazards by improper use

⚠ CAUTION

Hot surfaces possible on device housings!
Risk of injury! Risk of burning!

⚠ CAUTION

Risk of injury by improper handling!
Injury due to crushing, shearing, hitting or incorrect handling!

2.6.3 General information

- In case of damage due to non-compliance with the warnings in these operating instructions, Bosch Rexroth AG will not accept any liability
- Before the commissioning, the operating, maintenance and safety instructions are to be read. If you have not understood the documentation in the available language, please contact your responsible Bosch Rexroth customer service
- The unobjectionable and safe operation of this device requires appropriate and proper transport, storage, assembly and installation as well as careful operation and maintenance
- You must observe the safety regulations and provisions of the country where the device is used.
- The environmental conditions specified in the product documentation must be observed
- Technical data as well as connection and installation conditions are available in the operating instructions and must always be observed

2.6.4 Protection by means of protective extra low voltage (PELV) against electric shock

All connections and terminals on this Bosch Rexroth product are for protective extra low voltage, designed to be safe to touch in accordance with product standards.

⚠ WARNING

High electric voltage by incorrect connection!
Danger to life, risk of injury by electric shock!
- ▶ At all connections and terminals of this product, only devices, electric components and lines with protective extra low voltage (PELV) may be connected.
- ▶ All power sources for protective extra low voltage must ensure secure separation from dangerous voltages. These include:
  - – Accumulators
  - – Safety transformers according to VDE 0551
  - – Power sources with protection properties like functional low voltage with secure separation (PELV)

2.6.5 Protection against contact with hot parts

⚠ CAUTION

Hot surfaces possible on device housings!
Risk of injury! Risk of burning!
- ▶ Do not touch housing surfaces near sources of heat! Risk of burning!
- ▶ Before touching, first allow devices to cool down for 10 minutes after switching off.
- ▶ Touching hot equipment parts such as device housings in which cooling elements and resistors are located can lead to burns!

2.6.6 Protection during handling and assembly

⚠ CAUTION

Risk of injury by improper handling!
Bodily injury by bruising, shearing, cutting, hitting!
- ▶ Observe the general construction and safety regulations on handling and assembly.
- ▶ Use suitable assembly and transport equipment.
- ▶ Avoid jamming and bruising by appropriate measures.
- ▶ If necessary, use suitable protective equipment (for example safety goggles, safety shoes, protective gloves).

2.7 Personal protective equipment

The personal protective equipment for users of the product consists of:

- Safety shoes during teaching

All parts of the personal protective equipment must be in full working order.

2.8 Obligations of the operator

2.8.1 General information

The operator of the product is to provide for personnel training on the following subjects on a regular basis:

- Observation and use of the operating instructions as well as the legal provisions
- Intended operation of the Bosch Rexroth product
- Observation of the instructions from the factory security offices as well as the operator's operating instructions
- Behavior in case of emergency

The operator has to guarantee the required prerequisites for the set-up and the installation of the product and provides for:

- Safe set-up by their personnel and/or the persons authorized by them
- Compliance with the accident prevention regulations (UVV)
- Compliance with the safety regulations of the professional unions as well as further internal and local requirements

He shall in particular make sure that the underground

- Is stable
- Is level and horizontal

The operator will instruct their employees and/or those of third-party companies on possible dangers at the place of installation.
The operator must provide adequate illumination around the area of installation of the product.

2.8.2 Safety signs

Depending on the installation conditions, it may be necessary to attach warnings at the place of installation. The operator is responsible for attaching the safety signs.
For a recommendation regarding warnings, please refer to the following table.

Table 7: Prohibitory signs according to DIN EN ISO 7010 (2019)

Symbol	Description
	Open flames, fire, open ignition sources and smoking prohibited Registration number: P003
	Do not extinguish with water Registration number: P011

Table 8: Warning signs according to DIN EN ISO 7010 (2019)

Symbol	Description
	Warning! Hot surface Registration number: W017
	Warning! Obstacles on the floor Registration number: W007

Table 9: Mandatory signs according to DIN EN ISO 7010 (2019)

Symbol	Description
	Observe operating instructions Registration number: M002
	Wear safety footwear Registration number: M008

Symbol	Description
	Disconnect mains plug (before opening) Registration number: M006

2.9 Safety equipment

To protect people, the product is equipped with the following safety equipment:

- Contact-protected safety sockets
- Main switch
- Internal fuse protection of the supply voltage for extension modules

Main switch

The main switch button disconnects the product on all poles from the connected supply voltage.

Fuse protection of the supply voltages U_{LS} and U_A for extension modules

Fuse protection of voltage U_{LS} is ensured via micro-fuse. If the connector is used, this fuse also provides protection of voltage U_A.
If the available current of the supply voltage is lower (< 6.3 A) than the trigger current of the micro-fuse, it is not triggered in case of error.
This is the case if an external power supply unit with low power is used.
Information on correct selection of the external power supply unit and replacement of the micro-fuse can be found in the technical data.

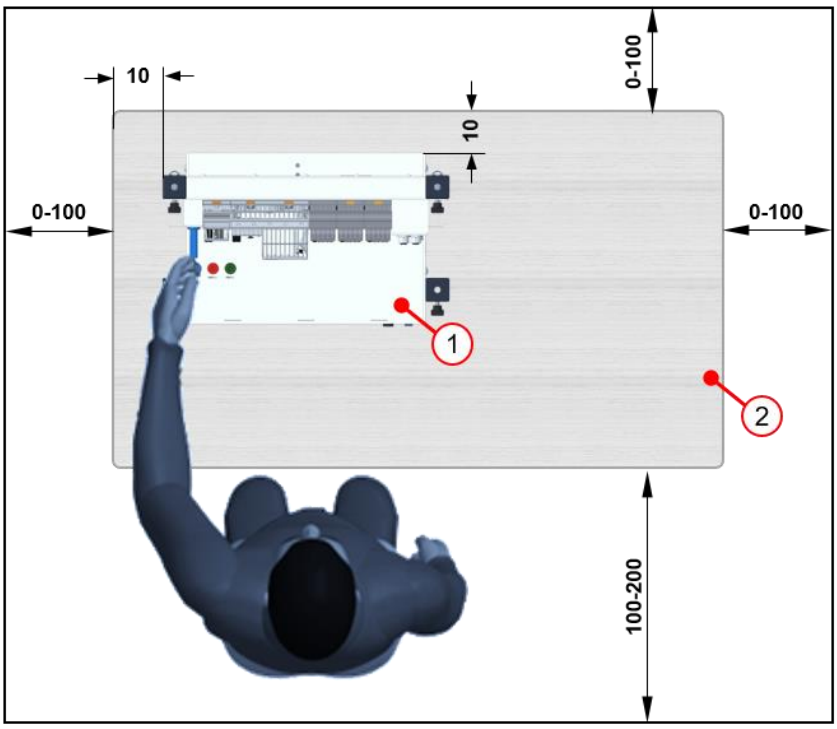
2.10 Operator workstations

2.10.1 General information

This chapter describes the space requirement for operation of the basic module to be ensured by the operator. Operation of the basic module in an office as well as in a training room are considered.
In general, sufficient lighting of the workstations in compliance with „Lighting of work places – DIN EN 12464-1“ must be ensured. According to DIN EN 12464-1, a light intensity of 500 Lux is recommended in the classification for „training institutions“ for training workshops, exercise rooms and laboratories. The criteria of the following list must also be taken into consideration.

- Prevention of blinding
- Sufficient evenness of indoor lighting
- Low shading
- Suitable light color
  - Color temperature of 4000 Kelvin is regarded to be suitable. This is neutral white.
  - To generate artificial daylight, a light color of approx. 6000 Kelvin can also be used. This light, however, has a light shade of blue and is not considered as pleasant by everyone.

The height of the worktable must be selected in such a way that ergonomic working is possible. To ensure stability of the basic module, a minimum distance of 10 cm should be ensured to the worktable edge in all sides. The spatial arrangement of the worktable may vary depending on the task.
For example, the rear and sides of the working table may also end at the wall in an office. In this case, the distance must only be ensured behind the operator. In general, an open escape path to an emergency exit must be ensured.

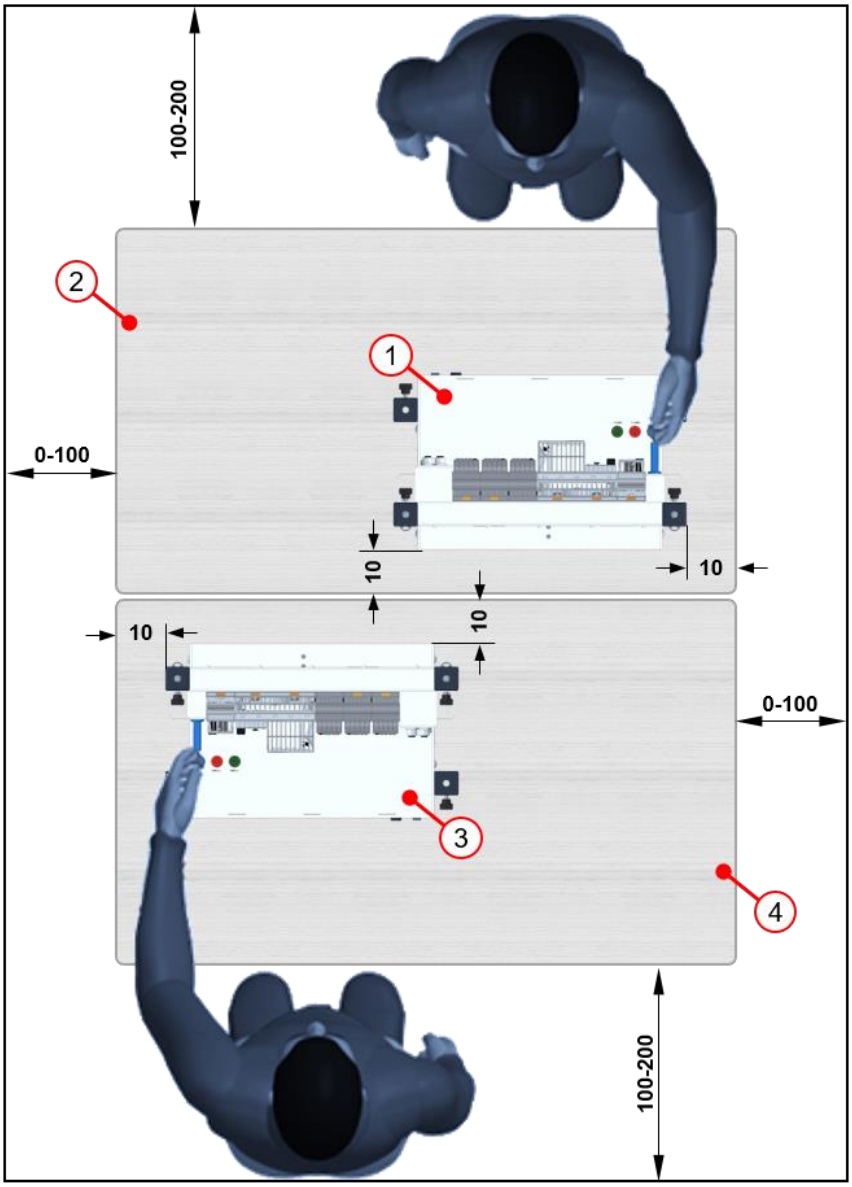


1 Basic module with extension module 2 Worktable

Fig. 1: Operator workplaces (dimensions in cm)

Table rows can also be arranged inside a training room. If the table width is sufficient, the tables can also be directly placed next to each other. If several rows of tables are in place, a passage width of 100-200 cm must be ensured between the table rows. Escape routes must be generally kept free and may not be obstructed. No cables should be routed on the ground in the passages. If this is not possible, the cables must be covered with suitable cable ducts or similar. If cable ducts are installed on the floor within the passage areas, a „Tripping hazard“ warning sign must be attached. Please refer to the table „Warning signs according to DIN EN ISO 7010 (2019)“ as of page [▶11].

The tables can also be arranged opposite of each other. Table rows can also be arranged opposite of each other. This worktable arrangement must also comply with the above criteria. See the following figure.



1 Basic module with extension module (worktable 1)
2 Worktable 1
3 Basic module with extension module (worktable 2)
4 Worktable 2

Fig. 2: Operator workplaces (dimensions in cm)

2.10.2 Teaching stations

The following teaching stations are provided depending on how the product is used:

Table 10: Teaching stations per training system

Work step	Recommended max. number of people
Set-up	1
Operating	1

3 General instructions concerning property damage and product damage

DANGER

Risk of fire due to overheating!
Risk of fire
- Ventilation of the device must not be obstructed by covering the ventilation openings with objects like documents, notes, etc.
- You should ensure extensively dimensioned air circulation around the device. You can thus prevent possible damage at the device as well as risk of fire due to overheating.
- Open fires must be kept away from the device at all times.

NOTICE

Danger due to improper handling!
Damage to property
- The product may only be operated according to the intended use.

NOTICE

Contamination by foreign bodies!
Premature wear and malfunctions
- During assembly, provide for cleanliness in order to prevent foreign bodies from getting into the basic module TS-AC B1-M2-1X and causing malfunctions.
- Before commissioning, ensure that all electric and mechanical connections have been made.

NOTICE

Energized system!
Damage to property
- Do not remove any electric connections as long as the training system and the exercise setup are connected to the power supply.
- Make sure that suitable external voltage supply (power supply unit) is available.

The warranty only applies to the supplied configuration. The claim to warranty expires if the product is assembled, commissioned and operated incorrectly, as well as used and/or handled improperly.

4 Scope of delivery

The following table lists all components that are included in the scope of delivery of the basic module TS-AC B1-M2-1X.
The term „not included in the scope of delivery“ refers exclusively to this table.
Regardless of this, additional components may be included in a device set in which this basic module is included.

Table 11: Scope of delivery

Quantity	Mat.-No.:	Designation
1	R901540131 	Basic module TS-AC B1-M2-1X Basic module with network switch
1	1827003218 	Measuring line TS-EC-1000 MM-RD Contact-protected measuring line, 4 mm, red, according to IEC EN 61010-031 (measurement category CAT II)
1	1827003219 	Measuring line TS-EC-1000 MM-BU Contact-protected measuring line, 4 mm, blue, according to IEC EN 61010-031 (measurement category CAT II)
1	R911405746 	Connector XVB-4/19 nsulated connector, Ø 4 mm, according to IEC EN 61010-031 of measurement category CAT II, connector width 19 mm
1	---	Master sheet / Scope of delivery
1	R901540429 	DOK-SUPPL*-TS-AC B1-M2-ITRS-EN-P Operating instructions (English)
1	R901540428 	DOK-SUPPL*-TS-AC B1-M2-ITRS-DE-P Operating Instruction (German)

4.1 Delivery condition

On delivery, the product is ready for operation. For operation, a suitable voltage source is required. For further specifications and details on connection, refer to the following chapters.

5 About this product

5.1 Performance description

The modular automation system of Bosch Rexroth was developed for basic and advanced training in the field of control technology. It supports the imparting of practical skills and knowledge in this field.

5.1.1 Information on IT security

ATTENTION! Unauthorized network access!
There is a risk of unauthorized network access if devices are connected to a network via Ethernet. To prevent unauthorized network access, observe the following information.

If possible, deactivate any unused communication channels.
Assign passwords to prevent unauthorized access and changes to the system.
Due to its communication interface, the basic module should not be used in safety-critical applications without additional security application.

For this reason, take additional protective measures (e.g. virtual networks (VPN) for remote access, firewalls, etc.) in compliance with IT safety requirements and applicable standards for your application to prevent unauthorized access.
Operation of systems and machines generally require implementation of a holistic state-of-the-art IT security concept.
The properties of the Bosch Rexroth products must be taken into consideration for a holistic IT security concept. The properties to be considered are documented in the IT security guidelines.

Information on reference to the guidelines can be found in chapter „Supplementary documentation” as of page [▶3].

5.2 Product description

The modular automation system enables practical simulation of complex industrial applications. For this task, individual modules are available and can be extended and combined as necessary. The basic module TS-AC B1-M2-1X serves as module carrier and basis for the various extension modules of this series of training systems.
The following figure illustrates the basic module TS-AC B1-M2-1X with blurred PLC extension module (TS-AC E2-M2-1X, R901540132).

The PLC extension module in the figure serves for illustration of the attachment of an extension module at the basic module. However, it is not included in the scope of delivery.

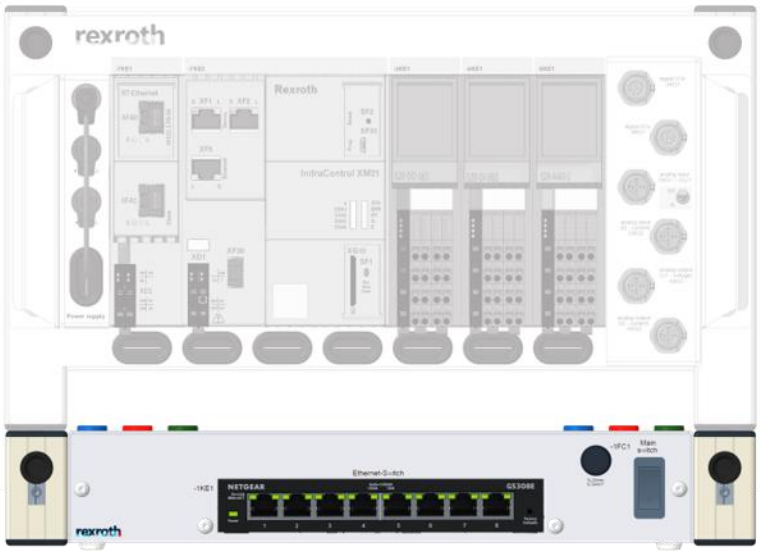


Fig. 3: Basic module TS-AC B1-M2-1X with extension module TS-AC E2-M3-1X

Description of the operating equipment at the front plate

The front of the basic module includes a main switch, an electric fuse and an Ethernet switch.
The main switch interrupts the supply voltage to the Ethernet switch and the safety sockets at the top of the module.
The voltage U_{LS} is protected via the device fuse.

1 Basic module front plate
2 Main switch
3 Device guse (5x20mm)
4 NETGEAR Ethernet-switch
5 Knurled screw for securing of attached extension modules

Fig. 4: Operating equipment on front plate

5.2.1 Voltage supply, general information

The voltage supply on the rear of the basic module TS-AC B1-M2-1X is divided as follows:

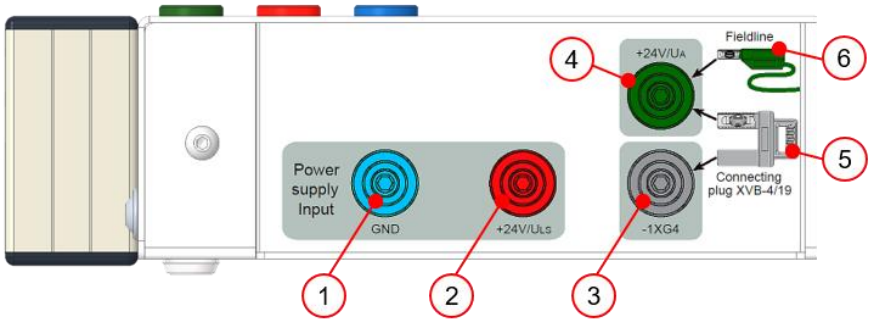
- Voltage supply for sensors and logics (e.g. PLC) – U_{LS}
  (red safety socket)
- Voltage supply for actuator technology - U_A
  (green safety socket)
- Ground (0V) – GND
- (blue safety socket)

If **no** external voltage supply is required for the actuator technology (U_A), connector ⑤ must be plugged in. This way, the supply voltage U_{LS} is bridged to voltage U_A via the black safety socket (-1XG4)

ATTENTION! For external voltage supply of the actuator technology (U_A), only modules from this series of training systems may be used.

For voltage supply, an external power supply unit with DC 24 V and 6.5 A (not included in the scope of delivery) should generally be used.

ATTENTION! Depending on the application, it may be necessary to remove the connector (⑤). Observe the specifications of the modules to be combined with this basic module.



1 Safety socket (GND)
2 Safety socket (+24V/U_{LS})
3 Safety socket (-1XG4)
4 Safety socket (+24V/U_A)
5 „Connector XVB-4/19“ symbol
6 Symbol „Contact protected measuring line“ symbol

Fig. 5: Voltage supply of basic module

5.2.2 Voltage supply for extension modules

For attachment of extension modules, 2 slots are available. Each slot is assigned 3 safety sockets for voltage supply of extension modules.
The following voltages are supplied:

- GND (blue safety socket)
- U_{LS} DC 24 V (red safety socket)
- U_A DC 24 V (green safety socket)

- Information on the attachment of extension modules can be found in chapter „Extension and modification“ as of page [▶45].

1 Slot 1 for extension module
2 Voltage supply for extension module (slot 1)
3 Slot 2 for extension module
4 Voltage supply for extension module (slot 1)

Fig. 6: Slots for extension modules

Attached extension modules are secured via the two knurled screws of the respective slot.

5.2.3 NETGEAR Ethernet-switch

The following information on the Ethernet switch are an excerpt of the data sheet and the installation manual of the NETGEAR Ethernet switch.

Table 12: NETGEAR GS308E features

Features	GS308E
Gigabit ports	8
Max. MAC inputs	4K
Buffer size	192 KB
Energy Efficient Ethernet (IEEE 802.3az) compliant	Yes
Transmission modes	Store-and-forward
Bandwidth	16 Gbit/s
DHCP client	Yes
System password	Yes
Web browser-based management GUI	Yes
PC utility	Yes
Port mirroring	Yes
Max. admissible number of source ports	7
Cable test utility	Yes
FW Upgrade Thru Plus Utility (TFTP)	Yes
LEDs per port	Speed, link, activity
LEDs at device	Power, system
SUPPORTED IEEE-STANDARDS	
• IEEE 802.3 Ethernet • EEE 802.3ab 1000BASE-T • IEEE 802.3u 100BASE-T • EEE 802.3ab 1000BASE-T	• EEE 802.1p Class of Service • IEEE 802.1Q VLAN Tagging • IEEE 802.3x Full-duplex Flow Control

5.2.4 Dimensional sheet

The following figure illustrates the outer dimensions of the basic module TS-AC B1-M2-1X including device feet and safety sockets.

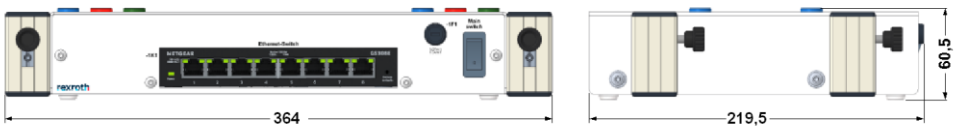


Fig. 7: Dimensional sheet of the basic module TS-AC B1-M2-1X (in mm)

5.3 Product identification

5.3.1 Type code

☞ The figure illustrates the general structure of the type code. For the latest information on the available versions, please consult your sales representative.

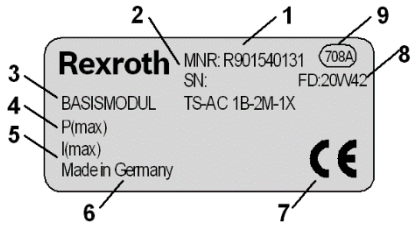
Table 13: Type code

Type designation	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
Example	**B**	**A**	**S**	**I**	**C**		**M**	**O**	**D**	**U**	**L**	**E**								**T**	**S**	**-**	**A**	**C**		**B**	**1**	**-**	**M**	**1**	**-**	**1**	**X**									
	①																			②			③			④			⑤			⑥									

①	**Product:** BASIC MODULE = BASIC MODULE
②	**System:** TS = Training system
③	**Series/construction type:** AC = Automation component
④	**Version:** B1 = Standalone, 2 slots B2 = Attachement type, 1 slot
⑤	**Option:** M1 = DC 24 V distribution M2 = Netwerk, DC 24 V distribution M3 = 1 emergency stop, 1x switch, 3x push button, 24 V distribution
⑥	**Type:** 1X = Type 1

5.3.2 Type plate

The information on the type plate is further described below.



1 Material number
2 Serial number
3 Device type
4 Technical data (opt.)
5 Technical data (opt.)
6 Country of manufacturing
7 CE marking
8 Production week, 20W42 refers to, e.g., year 2020, week 42
9 Factory ID

Fig. 8: Type plat (device)

6 Transport and storage

6.1 Transporting the product

DANGER

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!
Risk of injury or death for operator or third
- Chapter „Safety instructions" as of page [▶7] in these operating instructions must always be observed!

WARNING

Risk of injury, potential property damage during transport due to improper handling!
Risk of injury, property damage
- Do not walk or stand under suspended loads
- Always lift or carry the basic module separately
- Wear safety shoes

For transport of the basic module TS-AC B1-M2-1X, observe its protection class of IP20 according to DIN EN 60529.
Protection class IP20 means:
2 – protected against ingress of foreign particles >12.5 mm diameter
0 – not protected against ingress of water (humidity)

Prevent increased vibrations and shocks during transport and transport the product inside a packaging that protects it against dust and humidity.

6.2 Storing the product

NOTICE

Risk of damage caused by humidity and dampness!
Damage to property
- Protect the basic module from humidity by means of covers
- Storage only in rain-protected, dry rooms
- Protect the basic module against strong temperature variations, strong solar radiation and cooling in order to prevent the formation of condensation water and corrosion

The basic module TS-AC B1-M2-1X must be stored in a dry, dust-protected and vibration-free environment and protected from light and direct sunlight.

Table 14: Storage specifications for basic module TS-AC B1-M2-1X

Designation	Unit	Value
Storage temperature range	℃	-25 to +70
Relative air humidity	%	max. 90
No condensation	---	---
No ice formation/icing	---	---

Designation	Unit	Value
No occurrence of saline mist	---	---

6.2.1 Storage times

Independent from the storage duration, the function is maintained if additional measures are taken and observed for commissioning. However, no additional rights can be claimed under guarantee.

6.2.1.1 Cable and connector

Table 15: Storage time for cables and plug in connectors

Storage time / months			Measures for commissioning
>1	>12	>60	
■	■	■	Visual inspection of all parts for damage
	■	■	Check of electric contacts for corrosion
		■	Visual inspection of the cable sheath, do not use the cable in case of any irregularities (compressions, kinks, decolonization)

7 Assembly

7.1 Unboxing the product

DANGER

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!
Risk of injury or death for operator or third

- Chapter „Safety instructions" as of page [▶7] in these operating instructions must always be observed!

CAUTION

Danger due to parts falling out!
If the packaging is opened improperly, parts may fall out and cause damage or injuries.

- Put the packaging for unpacking on level, bearing ground
- Use personal protective equipment

CAUTION

Danger due to sharp and pointed packaging components
In case of improper handling, sharp and pointed parts of the packaging may cause injuries.

- Open the packaging using suitable aids
- Do not use sharp blades. Internal parts might be damaged

For unboxing of the device, proceed as follows:

- Carefully remove the basic module TS-AC B1-M2-1X from its packaging
- Remove all remaining packaging

Keep the original packaging during the guarantee period of the device for proper packaging and return in case of any guarantee claims.

Damage caused during transportation and defects shall be promptly recorded with a photo and reported in writing to the Bosch Rexroth customer service by way of a notification of claim.

Disposal of packaging material:
The packaging material has been selected for environmental compatibility. Dispose of the packaging material in accordance with the national regulations in your country and/or your company-internal specifications/procedures.

7.2 Installation conditions

The basic module is intended for use in office, laboratory, training and instruction environments. The admissible environmental conditions are listed in the following table.

Table 16: Installation conditions for basic module TS-AC B1-M2-1X

Designation		Unit	Valve
Min. operating temperature		℃	0
Max. operating temperature		℃	+40
Place of installation		---	Closed room
Ambient temperature		℃	+0 to +40
Max. relative air humidity		%	90 at 20 ℃
Max. installation height		m	3000 above sea level
Supply voltage / external power supply unit	Voltage (DC)	24	24 (±10%)
	Current [2]	6.5	6,5
	Module fuse protection [1]	6.3	6,3
A-weighted continuous sound level (at workplace of operating personnel)		dB	0

1) Micro-fuse 5 mm x 20 mm, 6.3 A, version mT (G fuse insert according to IEC 127-2-2).
2) Recommended by Bosch Rexroth for operation of the basic module up to its performance limits.

7.2.1 Installation position

☞ The product may only be used horizontally. The basic module TS-AC B1-M2-1X must be set up on a stable and level surface. Additionally, it must be ensured that sufficient workspace is available around the module for technical or training documentation. Detailed information can be found in chapter „Operator workstations" as of page [▶12].

7.3 Required accessories

⚠ WARNING

High electric voltage by incorrect connection!
Danger to life, risk of injury by electric shock!

- ▶ At all connections and terminals of this product, only devices, electric components and lines with protective extra low voltage (PELV) may be connected.
- ▶ All power sources for protective extra low voltage must ensure secure separation from dangerous voltages. These include:
  - Accumulators
  - Safety transformers according to VDE 0551
  - Power sources with protection properties like functional low voltage with secure separation (PELV)

For assembly of the basic module TS-AC B1-M2-1X, an external power supply unit for DC 24 V voltage supply is required. This is not included in the scope of delivery of the basic module. The Bosch Rexroth power supply unit listed in the following table can be used for the basic module TS-AC B1-M2-1X.

Table 17: Accessories required for assembly

Quantity	Mat.-no.	Designation
1	R961008981	Power supply unit 230 V, 10 A  Input voltage: AC 230 V, 50-60 Hz Output voltage: DC 24 V, 10 A

Optional power supply unit

For voltage supply of the basic module, also power supply units of other suppliers can be used. The following table provides the specifications to be met by a power supply unit of another supplier.

Table 18: Power supply unit specification

Designation	Designation	Unit	Value
Input data	EN61000-3-2 (PFC standard)	---	complied with
	AC input voltage	VAC	100-240 [1)]
	AC input frequency	Hz	50-60 [1)]
Output data	DC output voltage	VDC	24 / ±10%
	Output current	ADC	6,5 [2)]
	Output power	W	156 [2)]

1) Input voltage and input frequency depend on the power supply ratings of the respective country. For this reason, they may deviate from the specified values.

2) For operation of the basic module up to its performance limit, the specified values are recommended by Bosch Rexroth.

Compliance with national regulations and standards is within the responsibility of the operator. Bosch Rexroth AG does not assume any liability for damage caused by use of power supply units from other suppliers. The operator assumes all risks involved with the use of power supply units from other suppliers.

7.4 Assembling the product

DANGER

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!

Risk of injury or death for operator or third

- Chapter „Safety instructions" as of page [▶7] in these operating instructions must always be observed!

NOTICE

In case of damage, wear and/or contamination of the safety socket, functional safety of the plug-in connection can be no longer ensured!

Risk of damage of the basic module TS-AC B1-M2-1X, malfunction!

- Check the safety sockets by visual inspection for wear and contamination
- Remove any contamination on surfaces

NOTICE
Incorrect handling during connection or disconnection can cause damage at the safety socket or the safety plug. In case of damaged parts, functional safety of the plug-in connection can be no longer ensured! Risk of damage of the basic module TS-AC B1-M2-1X, property damage, malfunction! ▶ Before connection, make sure that – Plugs and socket are not broken, cracked or deformed – Contact pins are not bent, broken or corroded ▶ Make sure that plug and socket are not jammed and can be connected without force

NOTICE
Irregularities, variations, faults, defects during assembly or test! Risk of damage of the basic module TS-AC B1-M2-1X, property damage! ▶ Do not put the basic module into operation or take it out of operation without undue delay ▶ Determine the cause and remedy the defect. If this is not possible, inform the Bosch Rexroth customer service

Preparations for set-up

Proper execution of assembly requires that:

- The delivery, the transport and the unpacking according to chapter „Transporting the product“ as of page [▶25] and chapter „Unboxing the product“ as of page [▶27] have been properly completed
- All parts required are within reach and functional

Consider the following aspects before the final set-up:

- Make sure sufficient space is available for the basic module TS-AC B1-M2-1X. Also refer to chapter „Operator workstations“ as of page [▶12]. Any possible attachment parts should be taken into account
- Check the levelness of the assembly station
- Make sure that there is sufficient lighting at the set-up location
- Ensure compliance with the prescribed installation position of the basic module

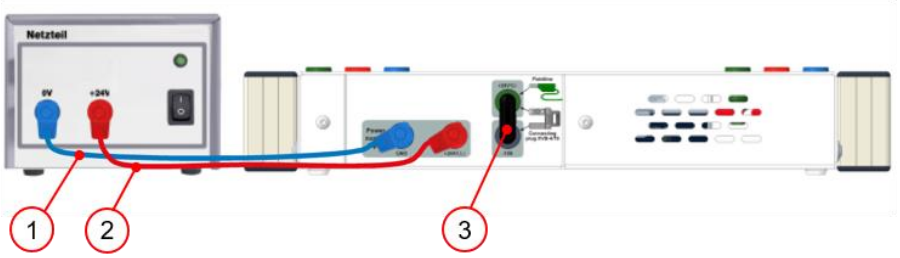
7.4.1 Connecting the power supply – U_A internally supplied

For electrical connection, an external power supply unit for DC 24 V is required. For information on the power supply unit specifications, refer to chapter „Required accessories“ as of page [▶28]. Additionally, the contact-protected measuring lines (red and blue) and the insulated connector included in the scope of delivery of the basic module are required. Information can be found in chapter „Scope of delivery“ as of page [▶17].

For connection of the basic module to the external power supply unit:

1 Connect port 0 V (GND) of the external power supply unit to the blue safety socket (GND) of the basic module with the blue measuring line (①)
2 Connect port +24 V (+) of the external power supply unit to the red safety socket (+24 V/U_{LS}) of the basic module with the red measuring line (②)
3 Connect the green safety socket (+24 V/U_A) to the lower black safety socket (-1XG4) of the basic module with the connector

The actions are illustrated in the following figure.



1 Contact-protected measuring line 4 mm, blue (mat.-no.: 1827003219)

2 Contact-protected measuring line 4 mm, red (mat.-no.: 1827003218)

3 Insulated connector 4 mm, connector width 19 mm (mat.-no.: R911405746)

Fig. 9: Connection of basic module to external power supply unit

The power supply of the basic module is established.

7.4.2 Connecting the power supply – U_A externally supplied

ATTENTION! For external voltage supply of the actuator technology (U_A), only modules from this series of training systems may be used.
Information on the electrical connection can be found in the specifications of the modules to be combined with the basic module.

8 Commissioning

Preparation for commissioning

Proper commissioning requires that:

- The delivery, the transport and the unpacking according to chapter „Transporting the product“ as of page [▶25] and chapter „Unboxing the product“ as of chapter [▶27] have been properly completed
- Proper completion of assembly including electrical connection according to chapter „Assembling the product“ as of page [▶29]
- All parts required are within reach and functional

8.1 First commissioning

DANGER

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!

Risk of injury or death for operator or third

- ▶ Chapter „Safety instructions” as of page [▶7] in these operating instructions must always be observed!

DANGER

High electrical voltage!

Danger to life, risk of injury by electric shock.

- ▶ Defective or damaged components or cables must be replaced. This also applies for the required power supply units and their connection cables
- ▶ Do not open any covers or device sockets during operation
- ▶ Do not separate or connect plug-in connectors when energized

CAUTION

Risk of tripping and falling!

Risk of tripping and falling due to incorrect routing of mains connection cables

- ▶ Do not route cables through passage areas
- ▶ Use cable bridges for routing of mains connection cables on the floor
- ▶ Do not tension the mains connection cable
- ▶ If necessary, use an extension cable with respective cross-section

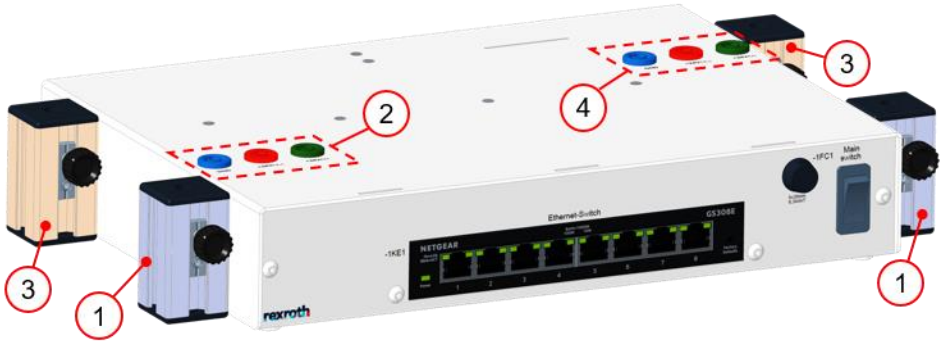
If a DC 24 V power supply unit with low output current is used, the basic module cannot be operated up to its performance limit.

ATTENTION! The required output current to be provided by the power supply unit is calculated from the total maximum current consumption of:

- Basic module
- Extension module
- Sensors
- Actuators

ATTENTION! Insufficient output current of the power supply unit can lead to application malfunctions. Setup of the required output current of the power supply unit is within the sole responsibility of the operator!

1 Activate the main switch (if applicable) of the external power supply unit
2 Activate the main switch at the front of the basic module
- The green power LED of the Ethernet switch is flashing
- At the safety socket for slot 1 and slot 2, „GND“, „+24 V/U_{LS}“ and „+24 V/U_A“ are applied
- If no extension module is available, the voltage can be checked with a multimeter at the safety sockets for slot 1 and slot 2



1 Slot 1 for extension module
2 Voltage supply for extension module (slot 1)
3 Slot 2 for extension module
4 Voltage supply for extension module (slot 2)

Fig. 10: Slots for extension modules

First commissioning is completed and the basic module can be used.

9 Operating

DANGER

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!
Risk of injury or death for operator or third
- Chapter „Safety instructions" as of page [▶7] in these operating instructions must always be observed!

In order to ensure safe operation of the basic module TS-AC B1-M2-1X, the following conditions must be met:
- Assembly, establishing of the power supply and installation have been carried out properly. Refer to chapter „Assembly" as of page [▶27]
- First commissioning was successfully completed. Refer to chapter „First commissioning" as of page [▶33]

For operation of the basic module, one or more extension modules are required. The basic module offers 2 slots for insertion of extension modules and securing with knurled screws. Additionally, voltage supply of these extension modules is established via the safety sockets. Operation of the basic module depends on the attached extension module.

9.1 Configuration of the NETGEAR Ethernet-switch

For operation of the basic module with extension modules, the NETGEAR Ethernet switch **does not need to** be configured. The default settings are sufficient. If it is still necessary to access the configuration menu, enter the IP address into the address bar of the web browser.
This is further explained in the following description.

For connection to the NETGEAR Ethernet switch, the IP address of the computer must be adjusted. For this, administrator rights are required. A patch cable is required to establish the connection, e.g. CAT.6A 2XRJ45-ST.

For connection, plug the patch cable into the Ethernet port of your PC and the other end into the Ethernet port 1 of the NETGEAR Ethernet switch.

Fig. 11: Network cable connection

The screenshots and settings have been made on a PC with Windows 10 operating system and only apply for this configuration.

1 Activate the main switch (if applicable) of the external power supply unit
2 Activate the main switch at the front of the basic module
– The green power LED of the Ethernet switch is flashing
3 Switch on the computer and start it up
4 Press „Win + r" to open the „Run" window

5 Enter „ncpa.cpl“ and confirm with Enter

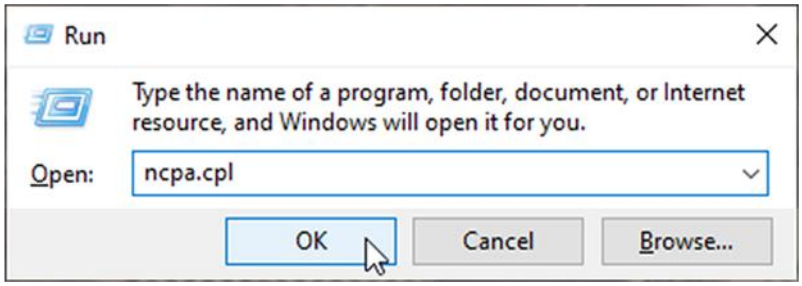


Fig. 12: Run „window“

6 The window with the network settings is opened
7 Look for the network adapter to which the NETGEAR Ethernet switch is connected
8 Select it by left click
9 Right click to open the context menu

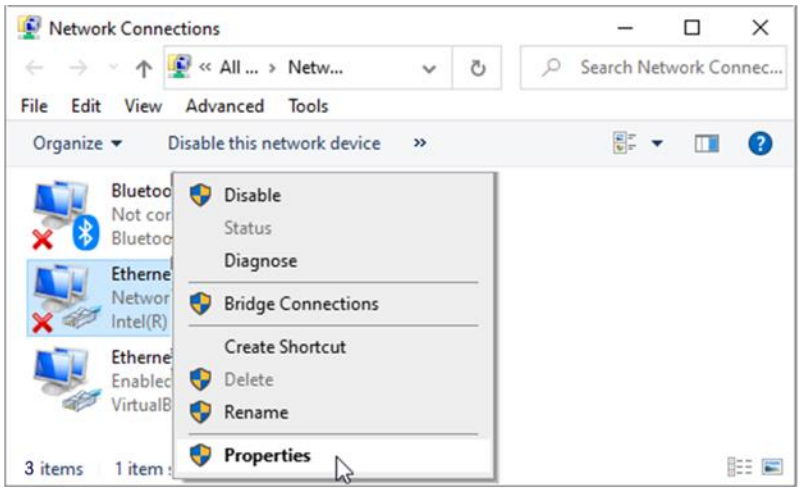


Fig. 13: „Network Connections“ window

10 Open the properties
11 Select „Internet Protocol Version 4 (TCP/IPv4)“ and open it via properties

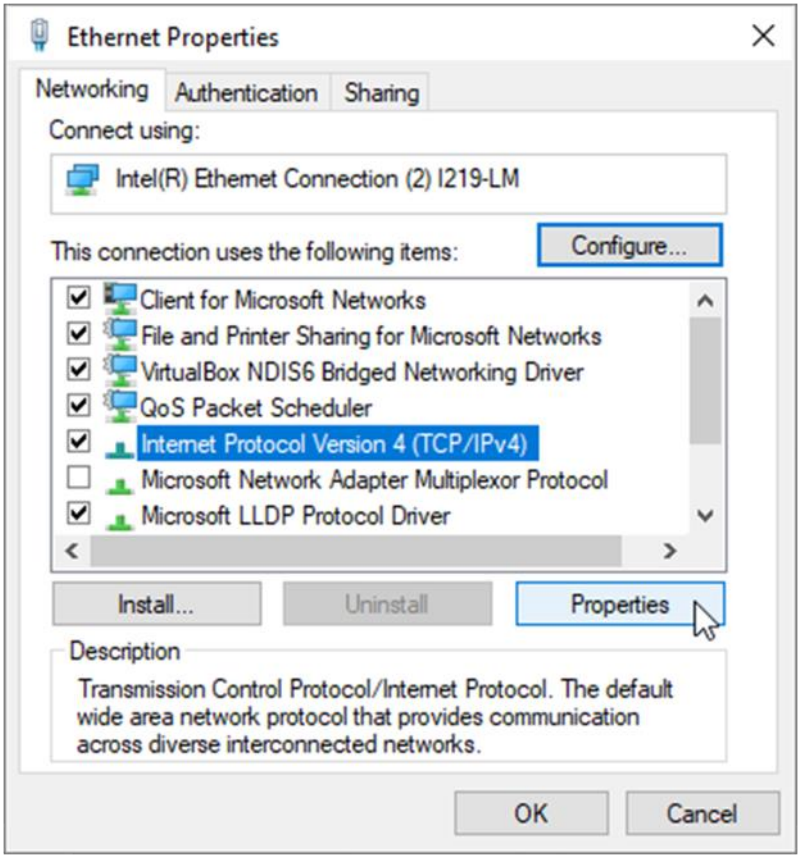


Fig. 14: „Ethernet Properties“ window

12 Select „Use the following IP address“ Enter the following IP address: **192.168.0.4** and the following subnet mask: **255 255 255 0**

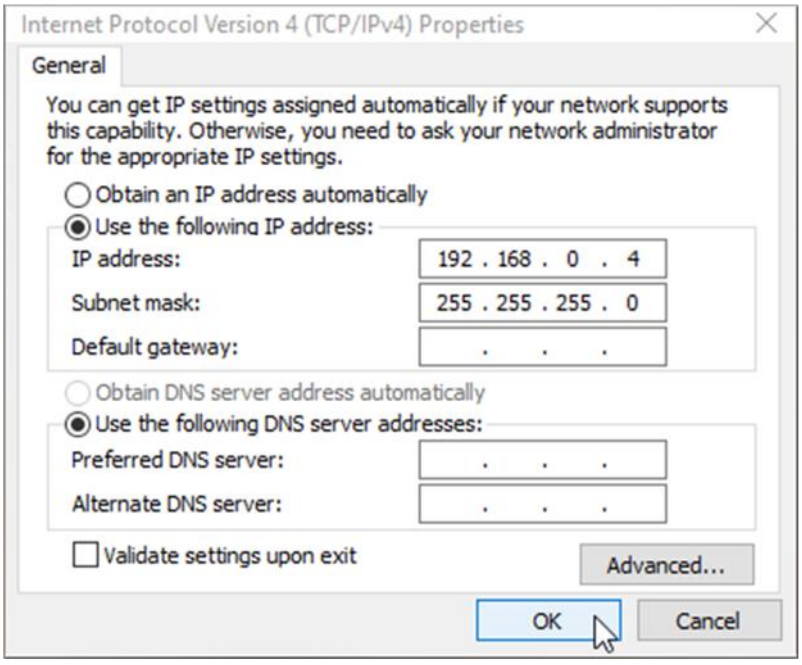


Fig. 15: TCP/IPv4 properties

13 Confirm the selection with „OK“

14 Close all windows and open a web browser, e.g. Google Chrome

15 Enter the IP of the NETGEAR Ethernet switch into the address bar of the web browser: http:\\192.168.0.239 and confirm with „ENTER“

▶ Enter the password „**password**“ for login.

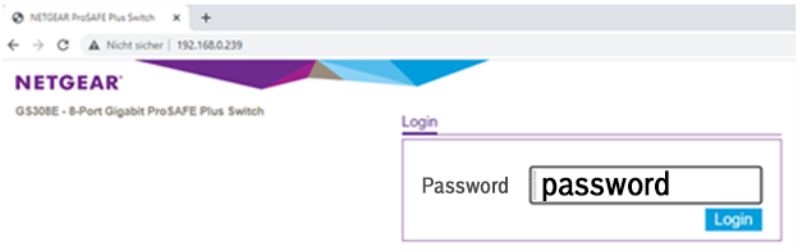


Fig. 16: Login screen“ window

16 The configuration page of the NETGEAR Ethernet switch is displayed

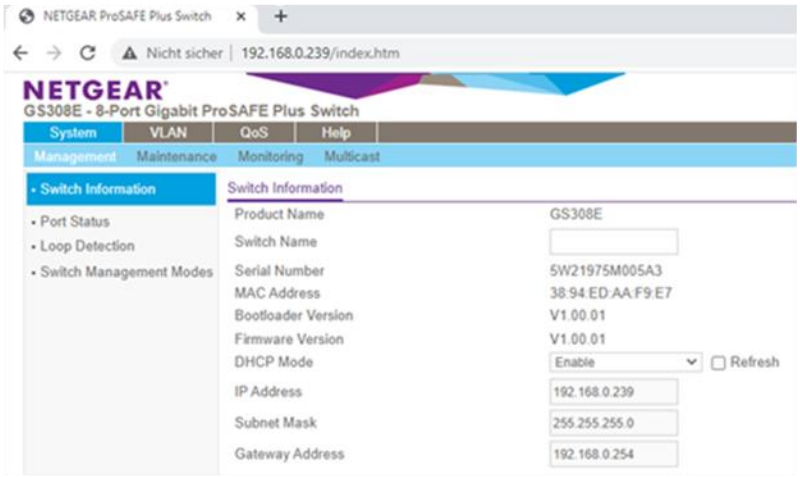


Fig. 17: NETGEAR Ethernet switch configuration menu

The default **IP address** of the NETGEAR Ethernet switch is **192.168.0.239** and the default login password is „**password**“.

If the changed IP address or password is lost, press the reset button at the front of the NETGEAR Ethernet switch to restore the default IP address and password.

10 Maintenance and repair

WARNING

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!
Risk of injury or death for operator or third
- Chapter „Safety instructions" as of page [▶7] in these operating instructions must always be observed!

Maintenance must be carried out by qualified personnel. Information can be found in chapter „Qualification of personnel" as of page [▶8].
For repair, please contact Bosch Rexroth customer service.

10.1 Cleaning and care

For cleaning of the basic module, observe the following points:

- With minor contamination (e.g. with dust), it is sufficient to wipe the component with a microfiber cloth
- For more stubborn contamination, use a damp cloth
- Do not use solvents or aggressive cleaning agents which may damage the painted surfaces
- Ensure that no liquids enter the housing through the ventilation slots
- Do not use compressed air for cleaning

10.2 Maintenance

WARNING

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!
Risk of injury or death for operator or third
- Chapter „Safety instructions" as of page [▶7] in these operating instructions must always be observed!

To keep the basic module TS-AC B1-M2-1X in an operational condition, all electrical equipment must be checked for defects or wear at regular intervals. Any defects or faults detected must be rectified immediately.
CAUTION! Maintenance and repair work may only be carried out by personnel qualified to do so. Information on this can be found in the chapter „Qualification of personnel" as of page [▶8]. Only original spare parts may be used to eliminate defects.
If in doubt, please contact our Service and Support. Contact persons and addresses can be found in the chapter „Service and support" as of page [▶53].

10.3 Spare parts

Table 19: Spare part list

Quantity	Mat.-no.	Designation
1	1827003218	Measuring line TS-EC-1000MM-RD
		Contact-protected measuring line, 4 mm, red, according to IEC EN 61010-031 (measurement category CAT II)
1	1827003219	Measuring line TS-EC-1000MM-BU
		Contact-protected measuring line, 4 mm, blue, according to IEC EN 61010-031 (measurement category CAT II)
1	R911405746	Connector XVB-4/19
		Insulated connector, Ø 4 mm, according to IEC EN 61010-031 of measurement category CAT II, connector width 19 mm

For spare parts orders contact Bosch Rexroth Service and Support. Contact details can be found in chapter „Contact addresses“ on page [▶53].

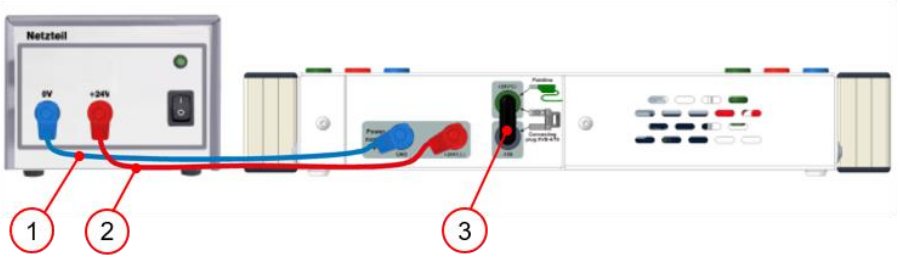
11 Diassembly and replacement

WARNING

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!
Risk of injury or death for operator or third

- Chapter „Safety instructions" as of page [▶7] in these operating instructions must always be observed!

The basic module TS-AC B1-M2-1X serves as the basic module of the modular Automax 100 device family. To disassemble the basic module TS-AC B1-M2-1X, only the electrical connection to the external power supply must be disconnected. To do this, disconnect the touch-proof test leads „1" and „2" at the rear of the device. The insulated connection plug „3" does not have to be disconnected for disassembly. See also the following figure.



1 Contact-protected measuring line 4 mm, blue (mat.-no.: 1827003219)
2 Contact-protected measuring line 4 mm, red (mat.-no.: 1827003218)
3 Insulated connector 4 mm, connector width 19 mm (mat.-no.: R911405746)

Fig. 18: Electrical isolation of the base module from an external power supply unit

If the basic module TS-AC B1-M2-1X has already been equipped with an extension module, the extension module is removed in the reverse order as described in the chapters „Extension by 1 level" as of page [▶45] and „Extension by 2 level" as of page [▶46].

12 Disposal

For disposal of the basic module, comply with the following instructions:

1 Disassemble the basic module into its individual components in order to recycle them
2 Separate the materials, e.g.:
- Steel
- Aluminium
- Non-ferrous metal
- Electronic waste
- Plastic
- Seals

12.1 Environmental protection

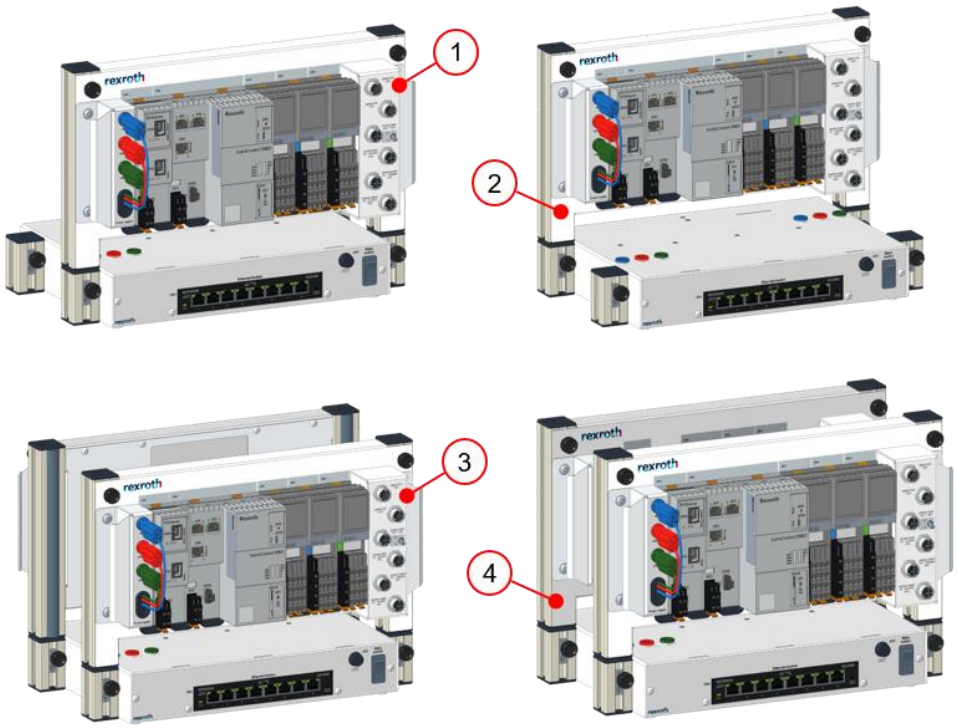
NOTICE
Careless disposal of the product and the packaging material may lead to environmental pollution. Illegal waste disposal can lead to criminal charges and fines ▶ Dispose of the product and the packaging material in accordance with the applicable national regulations in your country

13 Extension and modification

Extension of the basic module is described in the following chapter. For information on attachment and electrical connection, refer to the operating instructions of the respective extension module.

13.1 Extension by 1 level

For connection of extension modules, 2 slots are available. The extension modules can be plugged in and secured with knurled screws. The following figure illustrates the different fitting types.



1 Fitting type 1
2 Fitting type 2
3 Fitting type 3
4 Fitting type 4

Fig. 19: Fitting type 1 level

Fitting type 1

Slot 1 (front) of the basic module is fitted with an extension module. Voltage supply is established via the safety sockets assigned to slot 1.

Fitting type 2

Slot 2 (rear) of the basic module is fitted with an extension module. Voltage supply is also established via the safety sockets assigned to slot 1.

Fitting type 3

Both slots of the basic modules are fitted with extension modules. The extension module in slot 2, however, is installed towards the rear (turned). Thanks to this arrangement, the M12 system connectors are not obstructed.

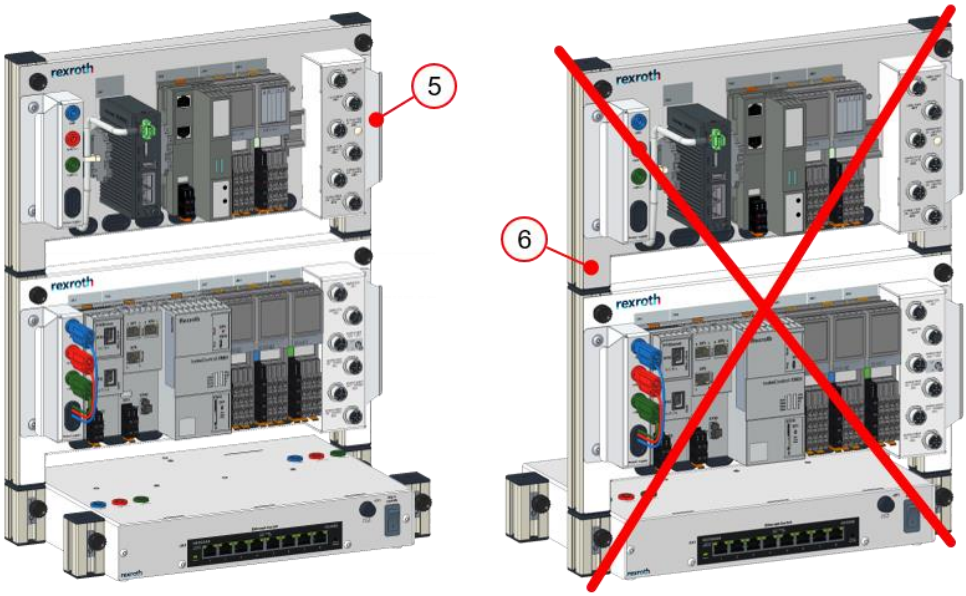
Fitting type 4

Both slots of the basic modules are fitted with extension modules. The extension module in slot 2 is installed towards the front. For simultaneous operation of both extension modules, this type cannot be recommended. Access to the M12 system connectors at module 2 is highly restricted. However, slot 2 can be used as parking position for modules which are not required.

13.2 Extension by 2 levels

Additional fitting types concern stacking of multiple extension modules.

Attention! Stacking of more than two extension modules is not recommended as this would compromise the stability (risk of tilting).



5 Fitting type 5

6 Fitting type 6

Fig. 20: Fitting type 2 levels

Fitting type 5

Slot 2 of the basic module is fitted with an extension module. A second extension module is then placed on the previously installed extension module. This fitting types offers the advantage that all M12 system connectors can be easily reached and all status indicators of the installed components are visible from the front.

Fitting type 6

Attention! If several extension modules are stacked, slot 1 of the basic module must not be used (risk of tilting).

13.3 Product rebuild

If the basic module TS-AC B1-M2-1X has already been equipped with an extension module, the extension module is removed in the reverse order as described in the chapters „Extension by 1 level“ as of page [▶45] and „Extension by 2 level“ as of page [▶46].

14 Troubleshooting

WARNING

Compromising of the training system, individual components or other assets. Risk for safe operation of the training system!

Risk of injury or death for operator or third

- Chapter „Safety instructions" as of page [▶7] in these operating instructions must always be observed!

CAUTION

Property damage due to improper handling!

Improper handling can lead to damage or defects at the device!

- Ensure correct polarity of connections. Observe the color coding!
- Any troubleshooting and measures in case of faults must be carried out without any mechanical force.

Table 20: Troubleshooting measures

Fault	Cause of error	Measures
No function of basic module	The external power supply unit is not connected to any voltage supply	Connect the external power supply unit to a suitable supply network. ATTENTION! The specification of the input voltage of the used external power supply unit must be observed.
	No voltage supply	Check the output voltage (DC 24 V) of the external power supply unit by means of a multimeter. As necessary, check the fuse protection of the output voltage of the external power supply unit. If the power supply unit has a main switch, check if it is activated.
	Device fuse defective at basic module	Check the micro-fuse on the front of the basic module (5x20 mm / 6.3 A).
	The input voltage at the basic module is incorrectly connected	Check correct polarity of the supply voltage.
No voltage at the safety sockets +24V/U_A at the top of the basic module	The safety sockets „-1XG4" and „+24V/U_A" are not bridged via „connector XVB-4/19"[1)].	Connect the safety sockets „-1XG4" and „+24V/U_A" via „connector XVB-4/19".

1) Depending on the application, the connector XVB-4/19 may not be needed

In case of any problems identifying the cause of the error, please contact Bosch Rexroth customer service.

Contact details can be found in chapter „Contact addresses" as of page [▶53].

15 Technical data

Table 21: Technical data - Automax 100 - Basic module TS-AC B1-M2-1X

Designation		Unit	Value
Total weight		kg	3.5
Dimensions	Depth	mm	219,5
	Width	mm	364
	Height	mm	60,5
Current consumption [1)]		A	1.5
Power consumption [2)]		W	36
Min. operating temperature		℃	0
Max. operating temperature		℃	+40
Place of installation		---	Closed room
Ambient temperature		℃	+0 to +40
Max. relative air humidity		%	90 at 20 ℃
Max. installation height		m	3000 above sea level
Protection class			IP20
Supply voltage / external power supply unit	Voltage (DC)	V	24 (±10%)
	Current	I	6,5 [3)]
	Module fuse protection	A	6.3 [4)]
A-weighted continuous sound level (at workplace of operating personnel)		dB	0

1) Current consumption of the basic module without extension module and connected actuator.
2) Power consumption of the basic module without extension module and connected actuator.
3) Recommended by Bosch Rexroth for operation of the basic module up to its performance limits. Alternatively, a power supply unit with lower output power can be used. ATTENTION! For this, the total power from basic module, extension module and actuators to be connected must be determined.
4) Micro-fuse 5 mm x 20 mm, 6.3 A, version mT (G fuse insert according to IEC 127-2-2).

16 Appendix

16.1 Electrical circuit diagram

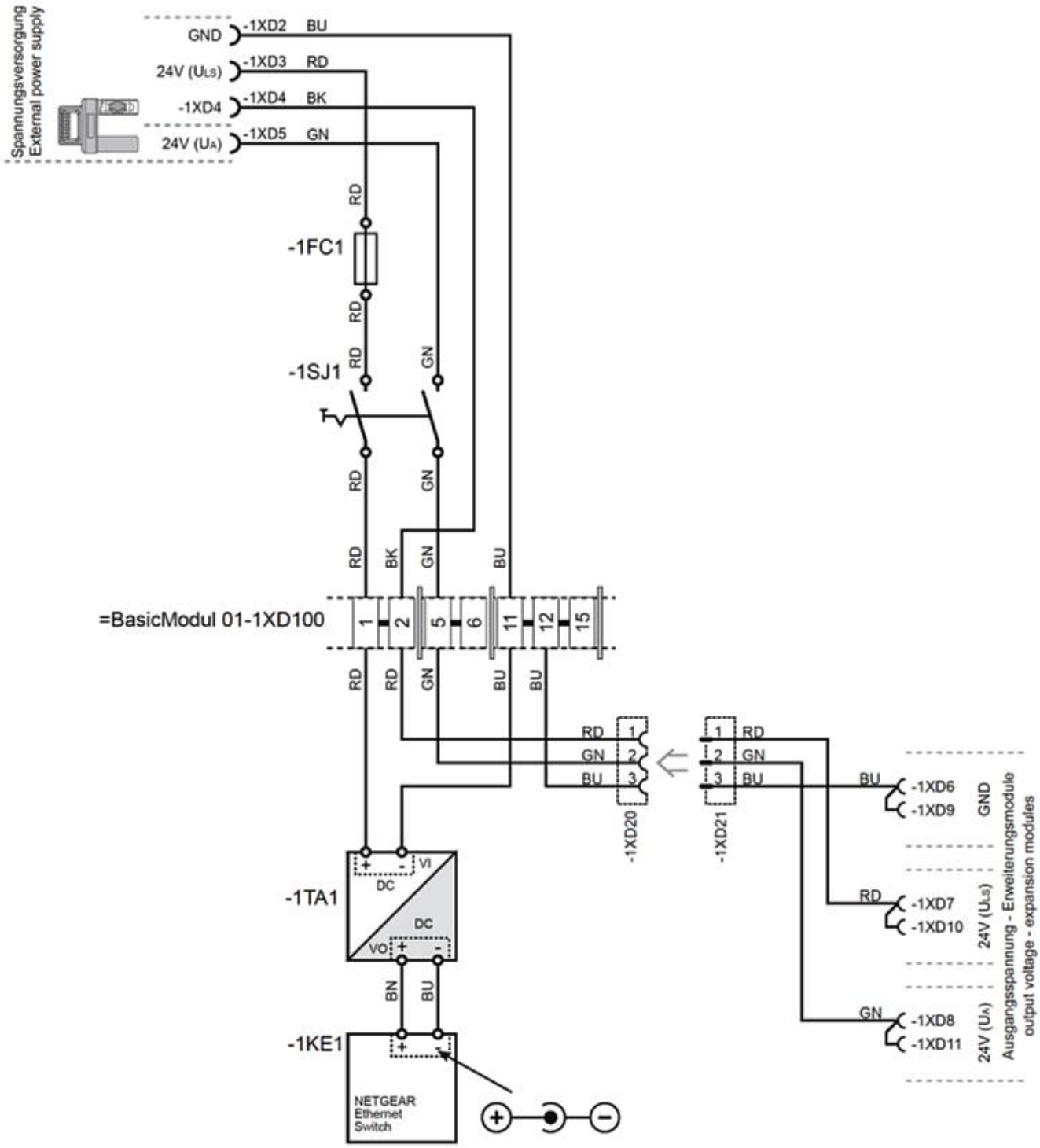


Fig. 21: Electrical circuit diagram

16.2 Spare part list

The following table lists the available spare parts for the basic module TS-AC B1-M2-1X.

Table 22: Spare part list

Quantity	Mat.-no.	Designation
1	1827003218	Measuring line TS-EC-1000MM-RD
		Contact-protected measuring line, 4 mm, red, according to IEC EN 61010-031 (measurement category CAT II)
1	1827003219	Measuring line TS-EC-1000MM-BU
		Contact-protected measuring line, 4 mm, blue, according to IEC EN 61010-031 (measurement category CAT II)
1	R911405746	Connector XVB-4/19
		Insulated connector, Ø 4 mm, according to IEC EN 61010-031 of measurement category CAT II, connector width 19 mm

For spare parts orders contact Bosch Rexroth Service and Support. Contact details can be found in chapter „Contact addresses“ on page [▶53].

16.3 Contact addresses

16.3.1 Service and support

If you have any questions about Bosch Rexroth components, our customer service helpdesk at the main plant in Lohr am Main will be happy to provide you with advice and assistance. Outside helpdesk hours, service can be contacted directly via the Service Hotline Germany.

	Helpdesk	**Service-Hotline Germany**	**Service-Hotline World**
Time	Mo.-Fr.: 7-18 Uhr	Mo.-Fr.: 18-7 Uhr Sa.-So.: 0-24 Uhr	Outside Germany, please first contact the person nearest to you. You can find the hotline number at the sales addresses on the Internet
Phone	+49 (0) 9352 40 50 60	+49 (0) 171 333 88 26 oder +49 (0) 172 660 04 06	
Fax	+49 (0) 9352 40 49 41	---	
E-Mail	service.svc@boschrexroth.de	---	
Internet	http://www.boschrexroth.com Here you will also find supplementary information on service, repair (e.g. delivery addresses) and training		

Preparation of information

We can help you quickly and efficiently if you have the following information ready:

- detailed description of the fault and circumstances
- Information on the nameplate of the products concerned, in particular type codes and serial numbers
- Telephone, fax numbers and e-mail address where you can be reached for queries

16.3.2 Contact for repair and spare parts

If you have any questions about our training systems, please contact us at the address below. Here you will be helped quickly and efficiently.

Bosch Rexroth AG

Bosch Rexroth Academy
Bahnhofplatz 2
97070 Würzburg
Germany
Phone: +49 (9352) 18-1920
e-Mail: training@boschrexroth.de
http://www.boschrexroth.de/training

Or the respective responsible sales companies.
Addresses can be found on the Internet at:
http://www.boschrexroth.com

16.4 Declaration of confirmity

Declaration of confirmity (German original).

rexroth
A Bosch Company

EU-Konformitätserklärung - *Original*
EC declaration of conformity

Dok.-Nr. / *Doc. No.*: DCA-DE_000207
Datum / *Date*: 02.2021

- ☐ nach Maschinenrichtlinie 2006/42/EG / *in accordance with Machinery Directive 2006/42/EC*
- ☐ nach Niederspannungsrichtlinie 2014/35/EU / *in accordance with Low Voltage Directive 2014/35/EU*
- ☐ nach EMV-Richtlinie 2014/30/EU / *in accordance with EMC Directive 2014/30/EU*
- ☐ nach Druckgeräte-Richtlinie 2014/68/EU / *in accordance with Pressure Equipment Directive 2014/68/EU*
- ☐ nach ATEX-Richtlinie 2014/34/EU / *in accordance with ATEX Directive 2014/34/EU*
- ☒ nach RoHS-Richtlinie 2011/65/EU / *in accordance with RoHS Directive 2011/65/EU*
- ☐

Hiermit erklärt der Hersteller, / *The manufacturer*

Bosch Rexroth AG
Academy
Bahnhofplatz 2
97070 Würzburg, Deutschland

dass das nachstehende Produkt / *hereby declares that the product below*

Bezeichnung / *Name*:	BASISMODUL TS-AC B1-M2-1X
Funktion / *Function*:	Trainingssystem für Aus- und Weiterbildung im Bereich der Automatisierung
Materialnummer / *Material number*:	R901540131
Baujahr / *Year of construction*:	ab 2021

in Übereinstimmung mit oben genannte(n) Richtlinie(n) entwickelt, konstruiert und gefertigt wurde. / *was developed, designed and manufactured in compliance with the above-mentioned directive(s).*

Die alleinige Verantwortung für die Ausstellung dieser EU-Konformitätserklärung trägt der Hersteller. / *This EC declaration of conformity is issued under the sole responsibility of the manufacturer.*

Angewandte harmonisierte Normen / *Harmonized Standards applied:*

Norm / *Standard*	**Titel / *Name***	**Ausgabe / *Issue***
DIN EN IEC 63000	Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährlicher Stoffe (IEC 63000:2016)	05 2019

Angewandte nationale Normen und technische Spezifikationen: / *National Standards and Technical Specifications applied:*

Norm / *Standard*	**Titel / *Name***	**Ausgabe / *Issue***
EN ISO 12100	Sicherheit von Maschinen –Allgemeine Gestaltungsleitsätze – Risikobeurteilung und Risikominderung	11 2010

Nachfolgende Person ist bevollmächtigt, die relevanten technischen Unterlagen zusammenstellen: / *The individual below is authorized to compile the relevant technical files:*

Name: / *Name:* Stohl
Anschrift: / *Address:* siehe Hersteller / view manufacturer

Weitere Erläuterungen / *Further explanations:*

Die Montage- und Installationshinweise gemäß Produktdokumentation sind zu beachten. / *The assembling and installation instructions according to the manual have to be followed.*

Würzburg	02.2021	i.V. Norbert Leidl, DC/SSD3	i.V. Betulio Rojas, DC/SSD4
Ort / *Place*	Datum / *Date*	Leiter / *Head* (Name, Abt.)	Leiter / *Head* (Name, Abt.)

Änderungen im Inhalt der EU-Konformitätserklärung sind vorbehalten. Derzeit gültige Ausgabe auf Anfrage.
We reserve the right to make changes to the content of the EC Declaration of Conformity. Current issue on request.

Fig. 22: Declaration of conformity

17 Alphabetical index

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Repla. For Version: ---

DOK-SUPPL*-TS-AC B1-M2-ITRS-EN-P